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Early predictors of first-year academic success at university: pre-university effort, pre-university self-efficacy, and pre-university reasons for attending university

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ABSTRACT

Given the large number of dropouts in the 1st year at university, it is important to identify early predictors of 1st-year academic success. The present study (n = 453 first-year students) contributes to literature on the transition from secondary to higher education by investigating how the non-cognitive factors *pre-university* effort and *pre-university* academic self-efficacy influence 1st-year retention at university. In addition, we examined *pre-university* reasons for attending university and whether these reasons were related to 1st-year retention. Multinomial logistic regression analyses showed that pre-university effort positively predicted 1st-year retention, whereas pre-university academic self-efficacy did not. With exploratory factor analysis and confirmatory factor analysis, we identified six pre-university reasons for attending university: career perspective, personal development, compliance with the social environment, attractiveness of the institution, recommended by others, and location. None of the pre-university reasons appeared to significantly predict 1st-year retention. Implications for research and practice are discussed.

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Effort; self-efficacy; reasons for attending university; academic success; higher education; non-cognitive

Introduction

The transition from secondary education to higher education (HE) is often experienced as challenging and difficult by students (Gale & Parker, 2014), which results in relative low retention rates in the first year compared to following years in HE (Tinto, 2012). For example, in The Netherlands, 33% of the university students drop out or switch after the first year (Inspectie van het Onderwijs [Dutch Inspectorate of Education], 2016). These substantial dropout rates also exist in the US; 20% of the students studying fulltime at 4-year HE institutions do not return to university for their second year (National Center for Education Statistics, 2015). In Australia, New Zealand, and the United Kingdom, approximately 7% to 19% of the bachelor students drop out after their first year (Australian

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Government, 2014; Education Counts, 2016; Higher Education Funding Council for England, 2016). Not all countries systematically document first-year retention, but also in France and in Belgium approximately 21% to 24% of the students leave HE without a qualification (Organisation for Economic Co-operation and Development, 2010), and in Germany 33% drop out of a bachelor degree (Heublein, 2014).

These dropout and retention rates have significant repercussions for HE finances; for example, in The Netherlands universities are state funded by number of graduates per year. Dutch HE institutions therefore have a clear interest in identifying early, pre-university predictors of first-year academic success to support students towards a successful transition to HE.

Traditional cognitive factors such as secondary school grade point average (GPA) and standardised ability test (SAT) scores are well-known and important positive pre-university predictors of first-year academic success (Robbins et al., 2004). Extant research has also shown that non-cognitive factors such as student learning behaviour and motivation are important predictors of academic success (Richardson, Abraham, & Bond, 2012; Robbins, Allen, Casillas, Peterson, & Le, 2006). However, these studies have mainly focused on how first-year academic success is affected by students' non-cognitive study behaviour *during* HE. In light of easing the transition from secondary school to HE, expanding the knowledge on how study behaviour *during secondary education* influences first-year academic success at university (e.g., Casillas et al., 2012) is relevant. In this study, we investigated *pre-university* non-cognitive factors (i.e., before students were enrolled at university) as predictors of first-year academic success. We hereby followed the approach of Robbins et al. (2004) and Richardson et al. (2012) in combining research on educational persistence and motivational theories on academic achievement.

We first present a short overview of the literature on predictors of academic success and explain the difference between traditional, cognitive predictors and non-traditional, non-cognitive predictors of academic success. We then focus on three malleable non-cognitive factors, namely, effort, academic self-efficacy, and reasons for attending university. The level of effort and self-efficacy, and the reasons for attending university can be changed by teachers and students themselves (Christenson, Reschly, & Wylie, 2012; Kember, Hong, & Ho, 2008; Wentzel & Wigfield, 2009), which makes them relevant factors for HE institutions trying to ease the transition from secondary to higher education and to increase first-year retention (Tinto, 2012).

Predictors of academic success

Extensive research has been conducted to identify why students successfully complete the first year of HE or not (Harvey, Drew, & Smith, 2006). Robbins et al.'s review (2004) and Richardson et al.'s meta-analysis (2012) provide a comprehensive overview of predictors of academic success. These studies distinguish between traditional or cognitive factors, and non-traditional, non-intellective, or non-cognitive factors. Cognitive factors refer to intellectual abilities and are usually measured with SAT scores and GPA. Non-cognitive factors refer to psychosocial and study skill factors and include self-regulated learning factors and motivation (Allen, Robbins, & Sawyer, 2009).

The studies of Robbins et al. (2004) and Richardson et al. (2012) have confirmed the influence of prior academic attainment (SAT and GPA). These studies also show that

several non-cognitive factors have a significant influence on academic success at university, additional to the influence of prior academic attainment. For example, Richardson et al. found that effort regulation and academic self-efficacy are two of the strongest predictors of academic success, controlled for prior academic attainment. We therefore include effort and academic self-efficacy in the present study to further investigate these constructs as possible *pre-university* predictors of first-year academic success.

In addition to effort and self-efficacy, another relevant non-cognitive concept is reasons for attending university (Kember et al., 2008). Students' reasons for attending university can be understood as a form of academic motivation (Ryan & Deci, 2000): Students can go to university for self-determined, intrinsic reasons like "I like to learn more about this domain" and/or for less self-determined, extrinsic reasons like "I go to university because my parents expect me to do so". Previous research shows that academic motivation is related to academic performance (e.g., Fortier, Vallerand, & Guay, 1995). To increase retention rates, Dutch HE institutions are keen to support student applicants during the process of choosing a study programme and stimulate them to choose from a more self-determined perspective, which is known as a positive predictor for academic success (Guiffrida, Lynch, Wall, & Abel, 2013; Kennett, Reed, & Stuart, 2013; Vallerand, Fortier, & Guay, 1997). The present study seeks to extend the existing research by exploring how *pre-university* reasons for attending university (measured during application for university) may predict first-year retention.

Effort

Effort is an important non-cognitive predictor of academic success and can be understood as a marker of energy or as active student behaviour in the student motivation process (Reschly & Christenson, 2012; Skinner & Pitzer, 2012). Effort indicates how engaged students do their academic tasks; it refers to trying hard, working hard, paying attention, and showing persistence when faced with challenging academic work (Pintrich, 2004; Richardson et al., 2012). It is seen as a student characteristic that can be controlled and changed by students (Skinner, Chapman, & Baltes, 1988), which makes it a relevant factor for our study on the transition from secondary education to HE and increasing first-year retention.

From previous studies, it is known that effort influences academic performance (see meta-analysis of Richardson et al., 2012 and Robbins et al., 2004) and is used by students as an explanation for success or failure (Graham & Williams, 2009). An explanation for success is, for example, "I tried hard" and for failure "I did not put forth all my effort". Effort thus influences (perceptions of individuals on their) past and future academic performance. In our study, we focus on *pre-university* effort; how is the level of effort during the last period at secondary school related to first-year retention at university? The measured level of effort in the present study should therefore be understood as a possible long-term, early indicator of first-year retention.

A study by Casillas et al. (2012) found that, after controlling for prior grades, effort during middle school (average age 13.5 years) was incrementally predictive of GPA during secondary school two years later. Several authors pointed out that it is not known whether the relationship between effort and academic success can be generalised to university applicants (cf.

Richardson et al., 2012). Our study contributes to filling this research gap by exploring the relationship between pre-university effort and first-year retention.

Academic self-efficacy

Academic self-efficacy, or students' perception of their capability to learn and perform, is another important non-cognitive factor in predicting academic success (Bandura, 1997; Schunk & Pajares, 2009). While effort is seen as active student behaviour, self-efficacy is seen as a motivational belief (Schunk & Mullen, 2012; Schunk & Pajares, 2009). Students' perception of their level of self-efficacy is based on past performance, performance of others, feedback of others on their capabilities and performances, and their own feelings about tasks or performances.

Reviews by Multon, Brown, and Lent (1991), Brown et al. (2008), and Richardson et al. (2012) convincingly showed that academic self-efficacy is related to academic success in HE. However, surprisingly little is known about how academic self-efficacy is related to academic success during the transition from secondary education to university. Although student applicants can only make a general future-oriented judgment of their capability to perform well at university, we expect that they are able to assess their capabilities to perform successfully based on their past experience in pre-university education (Pintrich, 2004, p. 397; Schunk & Pajares, 2009). In the present study, we therefore explore the possible relationship between pre-university academic self-efficacy and first-year academic success.

Reasons for attending university

For students, as well as for HE institutions and for society, it is important to choose a degree programme with careful consideration, because a mistaken choice can have a substantial (financial) negative impact for all parties. For example, Dutch HE institutions are primarily assessed and financed on the number of graduates per year. In addition, since 2015 Dutch students have no state funding of their tuition fees, and scholarships are not (yet) a commodity. Moreover, students' reasons for attending university have become increasingly relevant for Dutch HE institutions because since 2014 "matching" has become a legally obligated part of the application procedure for bachelor programmes (Ministerie van Onderwijs, Cultuur en Wetenschap [Dutch Ministry of Education], 2013). In practice, this means most applicants are asked to participate in one or more face-to-face group sessions to explicitly discuss their choice for the particular programme, or are asked to fill in a study choice questionnaire. In both situations, applicants receive feedback on how well they match with the programme. In case of a negative match, students receive the advice not to enrol. Students are not obliged to follow this advice if they applied before 1 May. After this date, institutions can decline applicants when the matching procedure gives a negative outcome. The assumption behind this policy is that choice support increases retention. Therefore, next to effort and self-efficacy, it is interesting to explore students' reasons for attending university when predicting academic success at an early, pre-university stage.

The educational persistence literature has focused mainly on reasons for dropping out (Tinto, 2012), and in choice motivation research the specific context of transitioning to HE

has previously not been a major focus (De Clercq, Galand, Dupont, & Frenay, 2013; Kember et al., 2008). Studies on reasons for attending university during the transition from secondary to higher education are mainly inspired by the self-determination theory (SDT). In this theory, three main dimensions of motivation are distinguished: intrinsic motivation, extrinsic motivation, and amotivation (Ryan & Deci, 2000). Intrinsic motivation refers to doing something because of interest, which fulfils feelings of competence and autonomy. For example, you choose a study programme for personal interest and development. Extrinsic motivated behaviour refers to doing something because it leads to a separable outcome, like choosing a study programme to please your parents. Extrinsic motivation can vary in self-determined behaviour: Internalisation and integration create a more self-determined behaviour, such as choosing a certain study programme because it gives good career opportunities. Lastly, amotivation refers to behaviour that lacks intentionality and a sense of personal causation (Ryan & Deci, 2000, p. 61), for example, choosing to attend university because there is nothing else the student can think of doing.

Kember et al. (2008) developed a motivation-orientation framework, inspired by SDT and based on empirical qualitative research among college and university students. The authors distinguished six motives why young adults want to attend HE: compliance (it is a logical step to go to university after secondary school), individual goals, personal interest, an appealing career perspective, sense of belonging to the student population, and student life style. Kember et al. (2008) and more recently Richardson et al. (2012) and De Clercq et al. (2013) concluded that the transition from secondary education to higher education and study choice behaviour, which is the context of our study, has not (yet) been a focus of motivation research.

Earlier studies (Guay & Vallerand, 1996; Vallerand et al., 1997) showed that self-determined motivation is related to academic achievement at high school. And recent studies (Guiffrida et al., 2013; Kennett et al., 2013) found that intrinsic reasons (like personal interest) predicted academic success best. But previous studies fail to take into account that students' reasons for going to university may be different *before they start university* than their reasons *after the transition* to university (e.g., during the first year or following academic years). This change in reasons might be caused, for example, by how students experience their study programme (Kember et al., 2008). The present study therefore contributes to the field of study success and student transition by exploring pre-university reasons for attending university, and how these pre-university reasons relate to first-year academic success.

The present study

Given the large number of students who drop out in the first year of university in The Netherlands and the aim to support students effectively in transitioning from secondary education to HE, our study focused on identifying early non-cognitive predictors of first-year retention. Reviews on non-cognitive factors of academic success emphasise the importance of students' effort and self-efficacy next to prior academic attainment (Richardson et al., 2012; Robbins et al., 2004). However, it is not known whether effort and academic self-efficacy displayed during secondary education influence academic success at university. In addition, as far as we know, reasons for attending university have not been measured before students start at university, and it is not known how these *pre-university* reasons relate to first-year academic success. The present study therefore contributes to fill

this gap in the literature by answering the following main research question (RQ): What is the relationship between the non-cognitive factors *pre-university* effort (RQ1), *pre-university* academic self-efficacy (RQ2), and *pre-university* reasons for attending university (RQ3) and first-year retention? Before answering the three research questions, we first explore students' pre-university reasons for attending university.

Method

Context

The present study was conducted at a large urban 4-year research university in The Netherlands. Dutch HE distinguishes between research-oriented education (WO) offered by research universities and higher professional education (HBO) offered by universities of applied sciences. Only a secondary education diploma at preparatory university level (VWO) gives direct access to a research university. Indirect access to a research university is also possible via completion of the first year of higher professional education (with additional subject requirements) (Nuffic, 2016). The present study focuses on students coming directly from secondary school with a preparatory university diploma, as this is the largest enrolment group for Dutch research universities.

The university in this study applies an academic dismissal policy, which requires students to make satisfactory progress during their first year at university. Students obtain credits for every sufficiently completed subject. Students who accumulate the maximum of 60 credits in the first year can proceed to the second year. Those who accumulate between 40 and 60 credits pass the first year provisionally; they can follow the second-year programme, but must accumulate all missing credits from the first year within the second year, otherwise they are dismissed from the programme. Students with fewer than 40 credits fail and are dismissed. Students who voluntarily drop out of a programme during the first year are distinguished as "stopped". Five schools of the university apply the described policy. Other schools within the university apply a different policy, and were therefore excluded from the present study.

For our particular study, the number of credits seemed to be a more appropriate and relevant measure than GPA. As described above, students from the involved university will be dismissed if they do not obtain a certain number of credits. Furthermore, Dutch universities are state funded by the number of students graduating from university. In Dutch universities, it is therefore less relevant for students to obtain a high or low GPA than to obtain the necessary credits. Students are generally focused on passing the minimum required grade (which is in general 5.5 on a scale from 1 to 10) and passing the first (and following) year(s). Within this context, we believe that number of credits was the most appropriate and relevant dependent measure to use in our study.

Procedure and participants

A total of 2,696 first-year bachelor students were enrolled in different schools at the university for the academic year 2011–2012. We invited all these students to fill in an online questionnaire measuring their effort during pre-university education, their level of pre-university academic self-efficacy, and their pre-university reasons for attending university.

Students filled in the questionnaire during their application for university; participation was voluntarily. Participants provided their identification numbers so academic results could be obtained from the university administration. The total response rate was 32% ($N = 863$). Additional participant selection from this sample was based on comparable academic dismissal policies at the schools of the university, prior academic attainment (i.e., preparatory university diploma), and retrievable academic results after one year at university. This resulted in a final sample of 453 participants from five different schools with comparable dismissal policies (i.e., Economics, Health Management, Law, Arts, and Philosophy) who completed a preparatory university track at secondary education (see Table 1). The t tests showed no statistically significant differences on effort (t (870) = .48, $p > .05$), self-efficacy (t (870) = 1.76, $p > .05$), and first-year retention (t (710) = −1.38, $p > .05$) between students in our final sample in comparison with students who were excluded from analysis. We therefore assume the final sample to be representative of the total number of students who responded to our questionnaire. There was no information available on non-response reasons. However, with the use of the university administration, we verified

Table 1. Participant background information ($n = 453$).

		n	%
Gender	Male	227	50.1
	Female	217	47.9
	Missing	9	2.0
	Total	453	100.0
Ethnicity[a]	Dutch ethnic majority	309	68.2
	Non-Western ethnic minority	109	24.1
	Western ethnic minority	29	6.4
	Missing	6	1.3
	Total	453	100.0
Socioeconomic status (SES) parents	High	297	65.6
	Middle	84	18.5
	Low	50	11.0
	Missing	22	4.9
	Total	453	100.0
Secondary school GPA	6.0 or <	13	2.9
	6.1 – 7.0	234	51.7
	7.1 – 8.0	114	25.2
	8.1 – 9.0	16	3.5
	9.1 – 10.0	0	0
	Missing	76	16.8
	Total	453	100.0
Academic discipline	Economics	216	47.7
	Health Management	80	17.7
	Law	104	23.0
	Arts and Philosophy	53	11.7
	Missing	0	0
	Total	453	100.0
Academic success	Passed (60 credits)	236	52.1
	Provisionally passed (40 – 59 credits)	83	18.3
	Failed (< 40 credits)	55	12.1
	Stopped[b]	35	7.7
	Missing	44	9.7
	Total	453	100.0

Note: The schools Arts and Philosophy were taken together because of a low number of respondents per school.
[a]Students belong to an ethnic minority group if at least one parent is born outside The Netherlands. Western ethnic minority students are not used in further analysis because this group was too small.
[b]Average attained credits = 5.

that our final sample did not differ in first-year retention compared to students in the non-response group who completed a preparatory university track at secondary education (χ^2 (3) = 7.7, $p > .05$). Therefore, we assume our sample is representative of the university's first-year student population who completed a preparatory university track at secondary education.

Measures

Based on previous research in the domain of educational persistence and motivation, we developed a questionnaire that fitted our research aim and the Dutch educational context. The questionnaire contained the following variables.

Pre-university effort

Effort during secondary education was measured by the nine-item school effort scale by Butler (2007). This scale is in line with earlier work of Skinner on agency beliefs for effort (Skinner et al., 1988). An example question is "I try my best during the lessons". The response categories ranged from 1 (*never*) to 5 (*always*). Cronbach's alpha was .81.

Pre-university academic self-efficacy

As the goal of the present study was to predict overall performance in the first year, academic self-efficacy was measured in general and did not focus on specific subjects like maths or languages. Students' expectations of their own performance during the first year at university were measured with an adapted version of the self-efficacy scale developed by Pintrich, Smith, Garcia, and McKeachie (1993) (e.g., "I think I will receive good grades in the first year"). The response categories ranged from 1 (*not true at all*) to 5 (*very true*). Cronbach's alpha was .90.

Pre-university reasons for attending university

To our knowledge, no instrument was available on reasons for attending university measured among students before they start at university. Based on the literature (cf. Kember et al., 2008; Ryan & Deci, 2000), therefore, 40 reasons for attending university were constructed (see Appendix 1). The reasons were formulated to measure motivation to attend university *before enrolment*. The questionnaire included reasons for attending university in general (e.g., "I want to have a good job later"), reasons for choosing a specific major (e.g., "The subjects of this programme intrigue me"), and reasons for choosing the specific institution (e.g., "The atmosphere at this university is pleasant"). The response categories ranged from 1 (*not a decisive factor at all*) to 5 (*a highly decisive factor*).

Academic success

Academic success was defined by the number of earned credits in the first year (cf. Beekhoven, De Jong, & Van Hout, 2002; Van den Berg & Hofman, 2005) as registered by the university administration. More specifically, the following categories were used: "passed" (60 credits), "provisionally passed" (between 40 and 59 credits), "failed" (less than 40 credits), and "stopped" (average obtained credits in this group was 5).

Control variables

From previous research, it is known that gender, ethnic background, socioeconomic status (SES), and secondary school GPA are associated with reasons for attending university and/or academic success (cf. Bruinsma & Jansen, 2009; Phinney, Dennis, & Osorio, 2006; Richardson et al., 2012). To control for these variables in predicting academic success, participants were asked to answer questions on gender (male/female), ethnic background (ethnic majority student/Western ethnic minority student/non-Western ethnic minority student), socioeconomic status (low/middle/high educational level of students' parents), and chosen academic discipline (Economics/Health Management/Law/Arts/Philosophy). Secondary school GPA was retrieved from The Education Executive Agency (Dienst Uitvoering Onderwijs or DUO).

Analyses

We used exploratory factor analysis (EFA in SPSS) and confirmatory factor analysis (CFA in AMOS) to distinguish the pre-university reasons for attending university. The Spearman correlation coefficient was used to explore the relationships between the variables included in this study.

Given the categorical nature of first-year academic success (passed, provisionally passed, failed, stopped), we used multinomial logistic regression analysis in SPSS to answer our questions whether pre-university effort is related to academic success (RQ1), whether pre-university self-efficacy is related to academic success (RQ2), and whether pre-university reasons for attending university are related to academic success (RQ3). We used the following covariates: gender, ethnicity, SES, secondary school GPA, and academic discipline. Using multinomial logistic regression, we compared the effect of predictors on a chosen reference group (e.g., students who passed the first year) to the other three categories (e.g., provisionally passed, failed, and stopped). We first compared students who had provisionally passed, failed, or stopped during the first year with those who had passed the first year. Next, we compared students who had stopped during the first year with those who had provisionally passed or had failed the first year. By doing this, we were able to compare all academic success groups.

We custom built one regression model in SPSS. The model contained main effects for the demographic characteristics (gender, ethnicity, SES, secondary school GPA, and academic discipline) and for the predictors effort, academic self-efficacy, and reasons for attending university. One interaction effect (ethnicity*SES) was added stepwise because the literature has shown a correlation between ethnic background and SES (Sirin, 2005).

Results

Exploratory and confirmatory factor analysis on pre-university reasons for attending university

First, we investigated the factor structure of the 40 pre-university reasons for attending university with exploratory factor analysis (EFA) (see Appendix 1 and Table 2). A 10-factor solution appeared to fit the data best (59% explained variance). A closer

Table 2. Results of exploratory factor analysis (varimax rotated) on reasons for attending university (n = 453).

Factor	k	Cronbach's α	M	SD
Career perspective	6	.84	3.70	.79
Personal development	5	.73	4.11	.64
Compliance with the social environment	3	.69	2.96	1.07
Attractiveness of the institution	4	.73	2.98	.93
Recommended by others	4	.72	2.29	.94
Location	3	.76	3.45	1.28

examination of the validity of each factor (with the general rules of thumb of a minimum of three items per factor, factor loadings above .500, and a discriminant loading of at least .200 with other factors and factor interpretability) resulted in six factors/reliable scales, based on 25 items. Career perspective (k = 6, α = .84) refers to the extrinsic motivation of a good job or salary; personal development (k = 5, α = .73) relates to the intrinsic motivation of willingness to learn and to develop knowledge; compliance with the social environment (k = 3, α = .69) refers to the motivation to go to university to meet the expectations of parents or family; attractiveness of the institution (k = 4, α = .73) refers to the physical and cultural atmosphere at the university; recommended by others (k = 4, α = .72) refers to the advice of friends and family about the intended programme; location (k = 3, α = .76) refers to the motivation of students to continue to live with their parents when starting university.

Second, we performed a confirmatory factor analysis (CFA) to evaluate the trimmed model containing six latent factors with 25 items as indicators. An EFA results in a solution in which all observed items load on all latent factors, (possibly) making the solution overly complex. We therefore evaluated the trimmed model with CFA in which we allowed each observed item to load on only one latent factor. The results showed a reasonable fit with the data (n = 453, χ^2 (259) = 611.22, p < .01, CFI = .90, RMSEA = .06, SRMR = .065). The combination of the EFA and CFA indicates sufficient construct validity of the six reasons for attending university.

Mean scores and correlations

Table 3 presents mean scores, standard deviations, and Spearman correlations of all variables. A high score corresponds to a high level of the construct. Respondents reported on average above 3.5 on a 1 to 5 scale for pre-university effort and pre-university academic self-efficacy. Personal development was the most important pre-university reason for students to attend university (M = 4.11, SD = .64), followed by career perspective (M = 3.70, SD = .79) and location (M = 3.45, SD = 1.28).

Of the demographic variables, ethnic background was negatively associated with first-year academic success (r_s = −.17, p < .01). This means that students with a non-Western ethnic background were less academically successful in their first year at university compared to students with a Dutch ethnic background. Secondary school GPA was positively related to academic success (r_s = .34, p < .01), indicating that a higher GPA is associated with a greater chance of passing the first year. Regarding the predictors, pre-university effort and pre-university academic self-efficacy both positively correlated with academic success (pre-university effort: r_s = .12, p < .05; pre-

Table 3. Means, standard deviations, and Spearman correlations between all variables (n = 453).

	Variable	*M (SD)*	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1.	Academic success Year 1	3.27 (.99)	(–)												
2.	Gender	1.49 (.50)	.00	(–)											
3.	Ethnicity	1.26 (.44)	−.17**	.17**	(–)										
4.	SES parents	2.57 (.69)	−.00	−.08	−.10*	(–)									
5.	Secondary school GPA	6.87 (.57)	.34**	−.04	−.12*	.09	(–)								
6.	Reason: career perspective	3.70 (.79)	−.03	−.09	.14**	.01	.00	(–)							
7.	Reason: personal development	4.11 (.64)	.11*	.15**	.10*	.05	.15**	.23**	(–)						
8.	Reason: compliance with the social environment	2.96 (1.07)	−.09	.02	.18**	.18**	−.07	.26**	.15**	(–)					
9.	Reason: attractiveness of the institution	2.98 (.93)	−.03	.07	.20**	−.03	−.05	.25**	.23**	.18**	(–)				
10.	Reason: recommended by others	2.29 (.94)	−.09	−.21**	.05	.02	−.06	.26**	.00	.38**	.33**	(–)			
11.	Reason: location	3.45 (1.28)	.11*	.03	.07	−.24**	−.06	.00	−.14**	−.05	.09	.12**	(–)		
12.	Pre-university effort	3.75 (.57)	.12*	.24**	.11*	−.05	.22**	.06	.38**	.03	.18**	.04	.06	(–)	
13.	Pre-university academic self-efficacy	3.62 (.59)	.10*	−.10*	.04	.04	.14**	.18**	.40**	.08	.19**	.08	.04	.22**	(–)

Notes: Variable 1 is coded as: 1 = stopped, 2 = failed, 3 = provisionally passed, 4 = passed. Variable 2: 1 = male, 2 = female. Variable 3: 1 = ethnic majority, 2 = non-Western ethnic minority. Variable 4: 1 = low, 2 = middle, 3 = high. Variable 5: 1–10 scale. Variable 6 until 13: 1–5 scale. Academic discipline was not included in the table because this is not a nominal or scale variable.
*p < .05; **p < .01; ***p < .001.

university academic self-efficacy: $r_s = .10$, $p < .05$). In other words, the more effort and academic self-efficacy students showed before enrolment, the more successful they were in the first year. Of the pre-university reasons for attending university, personal development ($r_s = .11$, $p < .05$) and location ($r_s = .11$, $p < .05$) showed a positive correlation with first-year academic success at university. This means that the more importance students attached to personal development and the possibility of continuing to live with their parents, the more successful they were in the first year at university.

Early predictors of academic success

We conducted a multinomial logistic regression analysis to investigate whether pre-university effort (RQ1), pre-university academic self-efficacy (RQ2), and pre-university reasons for attending university (RQ3) predict first-year academic success. The odds ratio (*OR*) indicates the effect of a predictor on academic success (see Table 4). An *OR* above 1 indicates an increased likelihood that students fall in the comparison group (e.g., stopped in the first year) and not in the reference group (e.g., passed the first year) as the predictor (e.g., effort) increases. An *OR* between 0 and 1 indicates a decreased likelihood that the students fall in the comparison group (e.g., stopped in the first year) as the predictor increases. Nagelkerke's R^2 represents the model fit. The results (see Table 4) show the constructed model had a good fit with the data (χ^2 (45) = 107.79, $p < .001$) and explained 33% of the variance. We found no interaction effect of SES*ethnicity and thus omitted it from the analysis. All following results reported below were not affected by mutual correlations between effort, self-efficacy, and reasons for attending university.

The results showed that effort during secondary school was important in predicting the likelihood of a student dropping out in the first year at university (RQ1). If the level of pre-university effort increased by one unit, the chance of stopping in the first year (instead of passing the first year) decreased by a factor of .31 (*OR* = .31, $p < .01$). In addition, if the level of pre-university effort increased by one unit, the chance of provisionally passing the first year (instead of stopping in the first year) increased by a factor of 2.79 (*OR* = 2.79, $p < .05$). These results indicate that effort at secondary school could make a positive difference between the chance a student (provisionally) passes the first year instead of stopping in the first year. Furthermore, the results show that if the level of pre-university effort increased by one unit, the chance of failing at the end of the first year (instead of stopping during the first year) at university increased about 5 times (*OR* = 5.08, $p < .01$). This means that pre-university effort could have a positive influence on persisting instead of dropping out in the first year at university.

We found no statistically significant difference in academic success for academic self-efficacy ($p > .05$) (RQ2). In other words, the level of academic self-efficacy when students applied for university had no influence on the chance of a student stopping, failing, provisionally passing, or passing the first year. Our results also showed that none of the pre-university reasons for attending university had an influence on academic success ($p > .05$) (RQ3). The pre-university reasons why students wanted to attend university thus had no effect on first-year academic success.

Table 4. Multinomial logistic regression analysis with pre-university effort, pre-university self-efficacy, and pre-university reasons for attending university on first-year academic success (n = 453).

	Stopped versus Passed (ref. group)			Failed versus Passed (ref. group)			Provisionally passed versus Passed (ref. group)			Stopped (ref. group) versus Failed			Stopped (ref. group) versus Provisionally passed		
Variable	*B*	*SE*	*OR*	*B*	*SE*	*OR*	*B*	*SE*	*OR*	*B*	*SE*	*OR*	*B*	*SE*	*OR*
Constant	22.87	5.28		13.34	4.06		7.66	2.90		−9.53	6.05		−15.21	5.53	
Background characteristics															
Gender															
Male	−.52	.53	.59	−.05	.8	.95	−.63	.39	.53	.47	.64	1.59	−.11	.59	.90
Ethnicity (Dutch ethnic majority ref. group)															
Non-Western ethnic minority	−.03	.63	.98	−1.50	.48	.22**	−1.25	.40	.29**	−1.47	.69	.23*	−1.22	.65	.29
SES	−.56	.31	.57	.21	.32	1.23	.32	.25	1.38	.77	.40	2.15	.88	.36	2.42*
Secondary school GPA	−.28	.07	.76***	−.20	.05	.82***	−.09	.04	.92*	.08	.08	1.08	.19	.07	1.21**
Academic discipline (Economics ref. group)															
Health Management	.04	.58	1.04	.11	.53	1.11	−.67	.47	.51	.07	.68	1.07	−.70	.65	.50
Law	−.98	.76	.38	−.52	.61	.59	−.97	.51	.38	.46	.89	1.58	.01	.84	1.01
Arts and Philosophy	.89	.10	.41	−20.61	.00	.00	1.64	.71	.20*	−19.72	.00	.00	−.75	1.12	.47
Pre-university predictors															
Effort	−1.19	.48	.31**	.44	.44	1.55	−.16	.34	.85	1.63	.58	5.08**	1.02	.52	2.79*
Academic self-efficacy	−.12	.46	.89	−.06	.40	.94	−.31	.31	.74	−.06	.55	1.07	−.19	.50	.83
Reasons for attending university:															
Career perspective	.17	.41	1.18	−.09	.32	.91	−.12	.26	.88	−.26	.46	.77	−.29	.43	.75
Personal development	−.11	.40	.90	−.34	.37	.71	−.04	.31	.96	−.23	.47	.79	.07	.44	1.07
Compliance with the social environment	.22	.27	1.13	−.04	.22	.96	−.08	.17	.92	−.26	.32	.77	−.30	.29	.74
Attractiveness of the institution	−.06	.29	.94	−.02	.26	.98	.14	.21	1.15	.05	.35	1.04	.20	.32	1.23
Recommended by others	.08	.31	1.09	.42	.26	1.52	.19	.22	1.21	.33	.36	1.40	.11	.34	1.11
Location	−.22	.19	.81	−.31	.17	.73	−.12	.14	.88	−.10	.23	.91	.09	.21	1.10

Note: Dependent variable is academic success (stopped, failed, provisionally passed, passed). OR = odds ratio. Covariates were gender, ethnicity, SES, academic discipline, secondary school GPA. Model $\chi^2(45) = 107.79$, $p < .001$. Nagelkerke $R^2 = .33$.

*$p < .05$; **$p < .01$; ***$p < .001$.

Discussion

The main objective of this study was to investigate non-cognitive pre-university predictors of first-year retention. In the section below, we discuss the results per research question (RQ), recommend directions for future research and practice, report our study limitations, and conclude.

An important finding of this study is that the more effort during the last year at secondary school, the lower the chance of dropping out in the first year at university (RQ1). This finding is in line with results of Casillas et al. (2012) that effort seems to have a long-term effect on academic performance, even during a period when students change school environment. An explanation of our result could be that students who drop out do not feel in control or do not have sufficient control over their level of effort (cf. Schmitz & Skinner, 1993): They might not have been able to increase their level of effort to attain the first year. This should be investigated in future research.

The finding that pre-university academic self-efficacy does not influence academic success contradicts our expectation (RQ2). Based on previous research (cf. Richardson et al., 2012), we expected that pre-university academic self-efficacy would explain some of the variance in first-year academic success. It may well be that the level of academic self-efficacy measured in the present study did not vary enough to find differences among students. Students who apply for a programme probably all think they can successfully complete it, otherwise they would not apply (Schunk & Pajares, 2009). For example, Dweck (2006) found that academic self-efficacy was less predictive of performance when students are in a transition phase during their academic career. We therefore recommend future research to conduct longitudinal studies to investigate students' academic self-efficacy during and after the transition to higher education, and to examine how this affects their performance.

The present study revealed six reliable constructs to indicate pre-university reasons for attending university: career perspective, personal development, compliance with the social environment, attractiveness of the institution, recommended by others, and location. Personal development, compliance, and career perspective are comparable to the reasons "interest", "compliance", and "career" as found in the qualitative study of Kember et al. (2008), which may imply that these reasons are relevant before and after enrolment at university. Furthermore, the reasons we found in our study can be interpreted in terms of Ryan and Deci's (2000) distinction between intrinsic and extrinsic motivation in the following way. Students who attend university for personal growth and because they feel comfortable at the chosen university can be viewed as intrinsically motivated students. Those who attend university because it can offer better career perspectives, because others recommend it and/or because it is expected of them (compliance), can be seen as extrinsically motivated.

Pre-university reasons for attending university were not related to first-year academic success (RQ3). In other words, academic success in the first year at university does not seem to be affected by students' initial motives to go to university, in contrast to reasons for attending university measured *during* university (Guay & Vallerand, 1996; Guiffrida et al., 2013; Vallerand et al., 1997). A first explanation for not finding a relationship between pre-university reasons and first-year retention may be the very fact that students are transitioning and going through important personal changes. Students' reasons for

attending university might change or loose relevance because of recent experiences during the first year at university. Longitudinal qualitative research is needed to shed light on how reasons may change during the transition from secondary education to HE to improve first-year retention. In addition, a more profound conceptualisation of the pre-university reasons by integrating, for example, orientations from the SDT (Ryan & Deci, 2000; Vallerand et al., 1993) may result in an instrument with more predictive power.

Implications for research and practice

First, the results of our study partly support and extend previous research on predictors of first-year academic success (Casillas et al., 2012; Richardson et al., 2012). The present study shows that, besides the traditional pre-university predictors such as secondary school GPA, the non-cognitive factor pre-university effort could be relevant when interviewing or selecting prospective students. Secondary education staff could stimulate effortful learning behaviour in addition to performance behaviour when preparing students for university. Moreover, the finding that students who show more effort in their final year in secondary education have less chance of dropping out in the first year can be used in study choice and information events to inform prospective students about successful studying at university.

Second, we contribute to the literature on academic motivation by identifying six *pre-university* reasons for attending university (Guiffrida et al., 2013; Kember et al., 2008; Kennett et al., 2013; Vallerand et al., 1993). While past studies showed that students who are more intrinsically motivated to attend university seem to be more academically successful (Guiffrida et al., 2013; Kember et al., 2008; Kennett et al., 2013; Vallerand et al., 1993), we found that pre-university reasons for attending university were not related to first-year academic success. However, from these first results it cannot be concluded that study choice support is not relevant. It is necessary to (theoretically) improve the instrument and repeat the study to create more robust conceptualisations of the pre-university reasons and how they relate to first-year retention.

Limitations and directions for future research

The sample in this study included students from several academic disciplines. Allen et al. (2009) recommend local research on the effectiveness of systems to identify students at risk, because this is necessary to develop effective intervention programmes. Unfortunately, the subsamples in our study were too small for discipline-specific predictions of first-year academic success. Future research should sample representative groups of students within academic disciplines to investigate the effects of pre-university effort, academic self-efficacy, and reasons for attending university on first-year academic success per discipline. Particularly, the relationship between reasons for attending HE and academic success per academic discipline could reveal some typical relationships.

The multinomial regression analyses showed that the covariates ethnicity, SES, secondary school GPA, and chosen academic discipline were significant predictors of academic success. This could explain the limited number of found effects. In addition to differentiation by academic discipline as recommended above, future research should focus on specific groups of students to gain deeper insight into pre-university predictors of first-

year academic success. Another explanation for the limited number of effects could be that we used first-year retention as our outcome variable. End-of-year GPA could be more sensitive to differences in pre-university effort, self-efficacy, and reasons for attending university.

Another weakness in this study is that participation was voluntary. The sample might be biased in that only motivated or disciplined students responded to the questionnaire. This possible range restriction might result in lower variation compared to a situation where all students would have responded. Thus, we may have found stronger associations if there had been more response variation among the students on pre-university effort, self-efficacy, and reasons for attending university. Therefore, we recommend that universities encourage student applicants to participate in questionnaires such as those used in this study, for example, by making the questionnaire part of their intake procedure. The benefits are twofold: This will increase representativeness of results, and policymakers and administrators will have tools to improve marketing, orientation interventions and selection procedures.

Lastly, in future research it would be interesting to investigate in more detail how pre-university effort, pre-university self-efficacy, and pre-university reasons for attending university are related to each other, and how they relate to levels of effort, self-efficacy, and performance during university. Can changes in this behaviour during the transition to HE explain why students succeed or fail the first year at university?

Conclusion

The present study showed that pre-university effort is a predictor of first-year academic success, whereas pre-university academic self-efficacy does not influence first-year academic success. Furthermore, we identified six pre-university reasons for attending university, namely, career perspective, personal development, compliance with the social environment, attractiveness of the institution, recommended by others, and location. However, none of the reasons were related to first-year retention. The results are relevant for explaining how students experience the transition to higher education, and could help university policymakers and administrators to increase retention rates.

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Appendix 1. Varimax rotated exploratory factor analysis on pre-university reasons for attending university (n = 453)

	Kept factors						Dropped factors			
Items per factor	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Career perspective										
I want to have a good job later.	**.549**	.072	.201	−.032	.061	.216	−.140	−.397	.042	.192
This programme will offer me solid employment prospects on the labour market.	**.785**	.080	.029	−.037	.065	.127	−.022	.081	.092	.067
The programme will offer me access to professions with a good name.	**.782**	.103	.049	.039	.064	.122	.070	.151	.159	.044
This programme offers better prospects for a good job than other programmes.	**.708**	.003	.009	.289	−.055	−.024	.211	.056	−.237	.032
The programme enjoys an excellent reputation.	**.500**	.139	.139	.325	−.192	.016	.069	.137	−.131	.363
This programme will help me earn a good salary later on.	**.802**	.015	−.048	.125	.066	.026	.009	.011	.013	.101
2. Personal development										
I want to expand my knowledge.	.020	.101	**.789**	.077	−.009	−.022	.157	−.121	−.013	.112
I enjoy learning.	−.081	−.001	**.604**	−.065	−.132	−.001	.420	.239	−.069	−.020
I want to achieve further personal development.	.021	.262	**.770**	.068	−.078	.051	−.026	−.052	.134	−.054
I aim to continue on to a programme of the highest possible level.	.176	−.105	**.607**	.012	−.054	.204	.086	.074	.004	.072
The subjects of this programme intrigue me.	−.004	.175	**.524**	−.120	.039	−.058	−.270	.288	.220	.071
3. Compliance with the social environment										
Other members of my family have studied or will also be studying at university.	.089	.104	.009	.215	−.086	**.690**	.024	−.038	.025	.093
My friends already study or plan to study at university.	.018	.033	.041	.368	−.071	**.576**	.032	.252	−.050	.129
My parents/family/guardians expect me to go to university.	.117	−.042	.043	.091	.052	**.779**	.225	.072	.042	−.087
4. Attractiveness of the institution										
The atmosphere at this university is pleasant.	.066	**.684**	.133	.101	.067	.013	.072	.195	.102	.157
This university offers an appealing range of student activities, which focus on sports, culture, opportunities to socialise.	.020	**.605**	.018	.213	.007	.104	.234	.206	.077	.115
I like the city of [city name].	.080	**.702**	.060	.101	.034	.071	.052	−.180	−.048	−.196
The campus of this university is appealing.	.078	**.654**	.057	.000	.132	−.046	.021	.157	−.087	.092
5. Recommended by others										
Others recommended this programme.	.162	.023	.035	**.715**	−.055	.039	−.061	.143	.009	−.024
I know students who are already enrolled in this programme.	.111	−.008	−.036	**.753**	.028	.141	.002	.015	.063	.023
Others recommended this institution.	.054	.281	.038	**.610**	.085	.136	.145	−.046	.108	.163
I know other students who want to go to this university.	−.019	.297	−.068	**.596**	.335	.166	.063	−.021	−.020	−.011
6. Location/stay living at home										
The university is located at a reasonable distance from my current place of residence.	.042	.180	−.044	.131	**.831**	.006	−.039	.032	−.009	−.065
I want to live in lodgings. *(recoded)*	.006	−.283	−.057	−.165	**.658**	−.131	.173	−.192	.161	−.030
I can live or continue to live at home.	.032	.149	−.060	.099	**.858**	−.011	−.092	.073	−.061	−.008
Dropped items										
I am eligible for admission to university by virtue of my diploma.	.111	.020	.123	−.153	.176	.389	.001	.128	−.284	.432
With my current diploma, my job prospects on the labour market are extremely limited.	.326	.079	.085	−.127	−.026	.125	−.099	.005	−.576	−.084
I see a university education as a logical next step in my academic career.	.141	.057	.438	−.226	.037	.381	−.101	.062	−.126	.275
Student life appeals to me.	.049	.418	.255	.137	−.382	.449	−.169	−.017	.034	−.170
I want to practise a certain profession later.	.343	.094	.152	.013	.006	.171	.105	.097	.527	−.101
This programme is a good match for my competences and abilities.	.234	.196	.361	−.008	.016	.087	−.128	.471	.247	−.051

(*Continued*)

Continued.

	Kept factors						Dropped factors			
Items per factor	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
This programme offers me a broad basis for the future.	.425	.218	.373	.088	−.087	−.140	.093	.158	.015	−.104
This programme has a higher standing in my everyday life than the other programmes I considered.	.391	.084	.147	.244	−.117	.295	.335	.034	.000	−.170
It is a programme that I can handle.	.289	.275	.063	.102	.062	.262	−.011	.526	.085	.042
The programme will offer me access to professions that appeal to me.	.397	.169	.264	.002	.028	−.016	−.060	.091	.552	.161
I fit in with the other students of this programme.	.154	.199	.086	.399	−.068	.160	.186	.511	−.057	−.024
This university has an outstanding reputation.	.225	.191	.080	.192	−.173	.041	.119	−.165	.199	.655
This university offers other appealing bachelor's programmes.	.120	.241	.069	.182	.299	.102	.515	.071	.072	.215
This university is an international education institution.	.141	.450	.160	−.011	−.174	.061	.496	−.098	.172	.196
This university offers appealing master's courses as a follow-up to a bachelor's programme.	.212	.460	.149	.164	−.008	−.028	.088	.139	.163	.342
This university is a multicultural educational institution.	.085	.483	.127	−.022	−.013	.205	.589	−.001	.075	−.050

Note: Factor loadings greater than .500 and with a discriminant loading of at least .200 with other factors are shown in boldface.